

WHAT IS CLAIMED IS:

Sub A1

1. An optimal high-speed multi-resolution retrieval method on a large capacity database comprising the steps of:

5 deriving the multi-resolution structure of a query "Q";

setting an initial minimum distance " d_{min} " to have the infinite value.

setting respective values of "i" and "l" to be "1".

deriving " $d^1(X_i, Q)$ ";

deriving " $d^L(X_i, Q)$ "; and

selecting data having a final value of " d_{\min} " as the best match.

2. The optimal high-speed multi-resolution retrieval method according to claim 1, wherein the step of deriving " $d^1(X_i, Q)$ " comprises the steps of:

if " $d^l(x_i, Q)$ " is more than " d_{\min} ", then removing the current candidate " x_i ", and updating respective values of "i" and "l" with " $i + 1$ " and "1"; and

if " $d^l(X_i, Q)$ " is not more than " d_{\min} ", then updating "l" with "i + 1".

3. The optimal high-speed multi-resolution retrieval method according to claim 1, wherein the step of deriving " $d^L(X_i, Q)$ " comprises the steps of:

if " $d^L(X_i, Q)$ " is more than " d_{\min} ", then removing the current candidate " X_i "; and

if " $d^L(X_i, Q)$ " is not more than " d_{\min} ", then updating " d_{\min} " with " $d^L(X_i, Q)$ ", and updating respective values of "i" and "l" 5 with "i + 1" and "1".

4. The optimal high-speed multi-resolution retrieval method according to claim 1, wherein the high-speed multi-resolution retrieval on the database is carried out using an inequality property expressed by the following expression:

$$d(X, Y) \equiv d^L(X, Y) \geq d^{L-1}(X, Y) \geq \dots \geq d^l(X, Y) \geq \dots \geq d^o(X, Y) \geq d^e(X, Y)$$

5. An optimal high-speed multi-resolution retrieval method using a cluster-based multi-resolution search algorithm adapted to output one best match, comprising the steps of:

performing a high-speed multi-resolution exhaustive search algorithm, thereby searching for a cluster " k_{\min} " having a minimum distance " d'_{\min} ";

20 setting an initial value of the " d_{\min} " to " d'_{\min} ", applying the high-speed multi-resolution exhaustive search algorithm to " $\Phi_{k_{\min}}$ ", thereby updating " d_{\min} ";

deriving " $d'^k(C_k, Q) - \delta_k$ "; and

selecting data having a final value of " d_{\min} " is selected 25 as the best match.

6. The optimal high-speed multi-resolution retrieval method according to claim 5, wherein the high-speed multi-resolution retrieval using the cluster-based multi-resolution search algorithm is carried out using an inequality property expressed by the following expression:

If $d^{l_k}(C_k, Q) - \delta_k > d_{\min}$, then $X_i^{\min} \in \Phi_k d(X_i, Q) > d_{\min}$
where, $l_k \leq L$

7. The optimal high-speed multi-resolution retrieval method according to claim 5, wherein " d_{\min} " is updated with a value expressed by the following expression:

$d_{\min} = X_i^{\min} \in \Phi_{k_{\min}} d^L(X_i, Q)$,
further comprising the steps of:
setting "k" to "1"; and
if $k = k_{\min}$, updating "k" with "k + 1".

8. The optimal high-speed multi-resolution retrieval method according to claim 5 or 6, further comprising:

if " $d^{l_k}(C_k, Q) - \delta_k$ " is more than " d_{\min} ", removing the cluster "k";

if " $d'^k(C_k, Q) - \delta_k$ " is not more than " d_{\min} ", applying the high-speed multi-resolution exhaustive search algorithm to " Φ_k ", thereby updating " d_{\min} "; and
updating "k" with "k + 1".

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9. An optimal high-speed multi-resolution retrieval method using a cluster-based multi-resolution search algorithm adapted to output a plurality of more-significant best matches, comprising the steps of:

10 performing a high-speed multi-resolution exhaustive search algorithm, thereby searching for a cluster " k_{\min} " having a minimum distance " d'_{\min} ";

15 if $n(\Phi_{k_{\min}}) \geq M$, searching for M more-significant best matches in accordance with an algorithm modified from the high-speed multi-resolution exhaustive search algorithm to search for the M more-significant best matches, and storing respective distance values of the searched more-significant best matches " $d_{\min}[\cdot]$ ";

20 setting "k" to "1", and if $k = k_{\min}$, updating "k" with "k + 1";

if $d'^k(C_k, Q) - \delta_k > d_{\min}[0]$, removing the cluster "k", and updating "k" with "k + 1";

25 updating " $d_{\min}[\cdot]$ " while applying the modified high-speed multi-resolution exhaustive search algorithm to " Φ_k ", and updating "k" with "k + 1";

setting "k" to "1", and if it is determined that the cluster "k" has been searched for, updating "k" with "k + 1";

if $d^{l_k}(C_k, Q) - \delta_k > d_{\min}[M - 1]$, removing the cluster "k", and updating "k" with "k + 1";

5 updating " $d_{\min}[\cdot]$ " while applying the modified high-speed multi-resolution exhaustive search algorithm to " Φ_k ", and updating "k" with "k + 1"; and

selecting M data corresponding to a final " $d_{\min}[\cdot]$ " as best matches, respectively.

10. The optimal high-speed multi-resolution retrieval method according to claim 9, wherein the high-speed multi-resolution retrieval using the cluster-based multi-resolution search algorithm is carried out using an inequality property expressed by the following expression:

If $d(C_k, Q) - \delta_k > d_{\min}^{\min}[M - 1]$, then $X_i \in \Phi_k$ $d(X_i, Q) > d_{\min}[M - 1]$

11. The optimal high-speed multi-resolution retrieval method according to claim 9, further comprising:

20 if $n(\Phi_{k_{\min}}) < M$, filling $n(\Phi_{k_{\min}})$ distance values in " $d_{\min}[\cdot]$ " in the order of higher values, starting from the lowest value, and storing the remaining elements of " $d_{\min}[\cdot]$ " with the infinite value.